

## CLAIMS

What is claimed is:

1. A protected network, comprising:

a plurality of primary nodes interconnected by a set of pre-provisioned working path segments between a source and a destination; and

a plurality of backup nodes interconnected by a set of pre-provisioned protection path segments between the source and the destination, each backup node also being interconnected with an associated one of the primary nodes by a corresponding one of a set of pre-provisioned, bidirectional shunt segments;

wherein:

each primary node is operative, (i) under normal working circumstances, to direct input traffic from an upstream working path segment to a downstream working path segment, (ii) upon occurrence of a failure on the upstream working path segment, to direct input traffic from an input shunt segment to the downstream working path segment, and (iii) upon occurrence of a failure on the downstream working path segment, to direct input traffic from the upstream working path segment to an output shunt segment; and

each backup node is operative, (i) upon occurrence of a failure on the downstream working path segment of the associated primary node, to direct input traffic from an input shunt segment to a downstream protection path segment, and (ii) upon occurrence of a failure on the upstream working path segment of the associated primary node, to direct input traffic from an upstream protection path segment to an output shunt segment.

2. A protected network according to claim 1, wherein each backup node is further operative, upon occurrence of a failure of the

3 associated primary node, to direct input traffic from an upstream  
4 protection segment to a downstream protection path segment.

1 3. A protected network according to claim 1, wherein the working  
2 segments, protection segments, and shunt segments comprise  
3 label-switched paths.

1 4. A protected network according to claim 1, wherein each primary  
2 node is associated with a different one of the backup nodes.

1 5. A protected network according to claim 1, wherein at least two  
2 of the primary nodes are associated with the same one of the  
3 backup nodes and interconnected thereto by corresponding ones of  
the shunt segments.

1 6. A protected network according to claim 1, wherein each primary  
node is directly connected to the associated backup node without  
any intervening nodes capable of terminating network segments.

1 7. A protected network according to claim 1, wherein the  
destination is a first one of at least two destinations for  
traffic generated by the source, and further comprising (i) an  
4 additional primary node interconnected by additional  
5 pre-provisioned working path segments between a branching one of  
6 the primary nodes and a second one of the destinations, and  
7 (ii) an additional backup node interconnected by additional  
8 pre-provisioned protection path segments between a branching one  
9 of the backup nodes and the second destination, the additional  
10 backup node also being interconnected with the additional primary  
11 node by a corresponding additional shunt segment, and wherein the  
12 additional primary and backup nodes and the branching primary and  
13 backup nodes are respectively operative in a manner similar to the

14 other primary and backup nodes to effect protection switching of  
15 traffic from the source to the second destination.

1 8. A method of operating a protected network including a plurality  
2 of primary nodes interconnected by a set of pre-provisioned  
3 working path segments between a source and a destination,  
4 comprising:

5 interconnecting a plurality of backup nodes by a set of pre-  
6 provisioned protection path segments between the source and the  
7 destination, and further interconnecting each backup node with a  
8 corresponding one of the primary nodes by a corresponding one of a  
9 set of pre-provisioned, bidirectional shunt segments;

10 at each primary node, (i) under normal working  
11 circumstances, directing input traffic from an upstream working  
12 path segment to a downstream working path segment, (ii) upon  
13 occurrence of a failure on the upstream working path segment,  
14 directing input traffic from an input shunt segment to the  
15 downstream working path segment, and (iii) upon occurrence of a  
16 failure on the downstream working path segment, directing input  
17 traffic from the upstream working path segment to an output shunt  
18 segment; and

19 at each backup node, (i) upon occurrence of a failure on the  
20 downstream working path segment of the associated primary node,  
21 directing input traffic from an input shunt segment to a  
22 downstream protection path segment, and (ii) upon occurrence of a  
23 failure on the upstream working path segment of the associated  
24 primary node, directing input traffic from an upstream protection  
25 path segment to an output shunt segment.

1 9. A method according to claim 8, further comprising at each  
2 backup node, upon occurrence of a failure of the associated  
3 primary node, directing input traffic from an upstream protection  
4 segment to a downstream protection path segment.

1 10. A method according to claim 8, wherein the working segments,  
2 protection segments, and shunt segments comprise label-switched  
3 paths.

1 11. A method according to claim 8, wherein each primary node is  
2 associated with a different one of the backup nodes.

1 12. A method according to claim 8, wherein at least two of the  
2 primary nodes are associated with the same one of the backup nodes  
3 and interconnected thereto by corresponding ones of the shunt  
4 segments.

1 13. A method according to claim 8, wherein each primary node is  
2 directly connected to the associated backup node without any  
3 intervening nodes capable of terminating network segments.